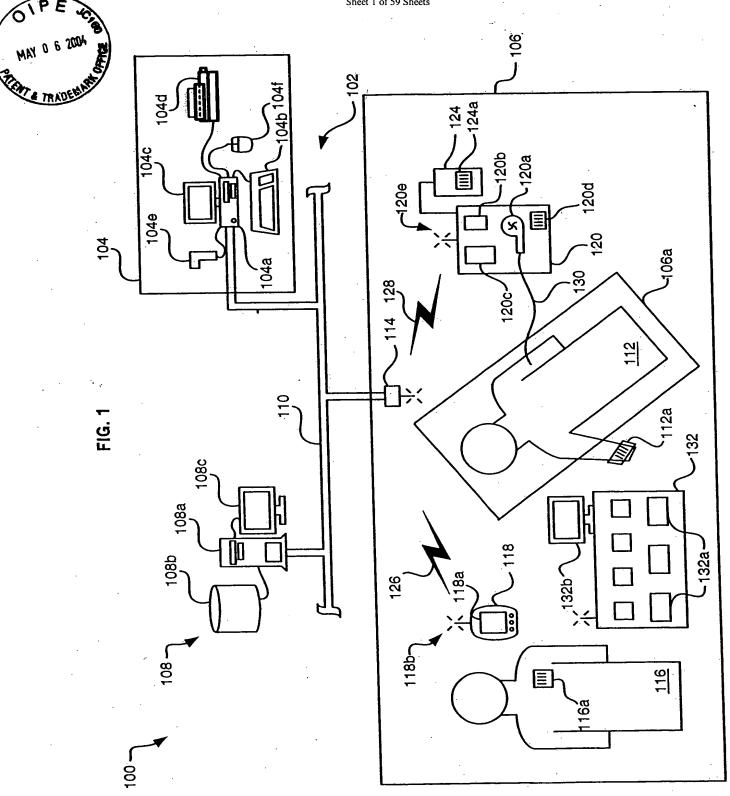
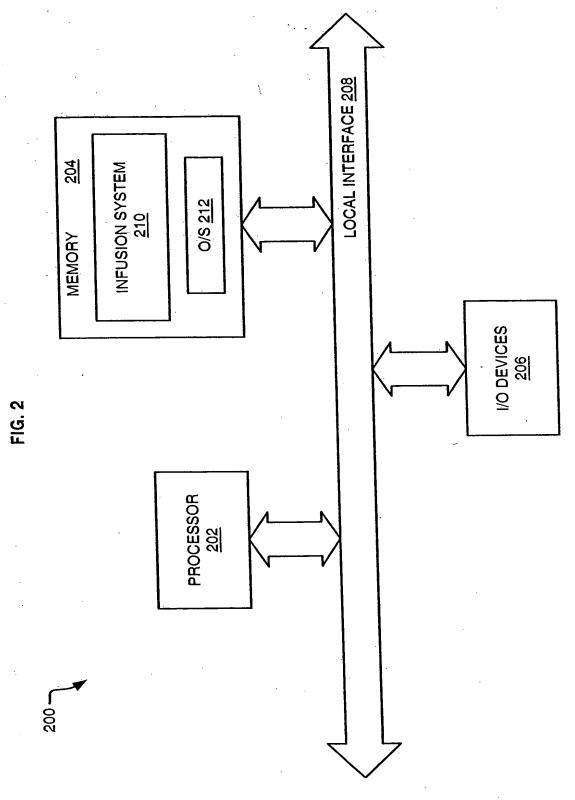
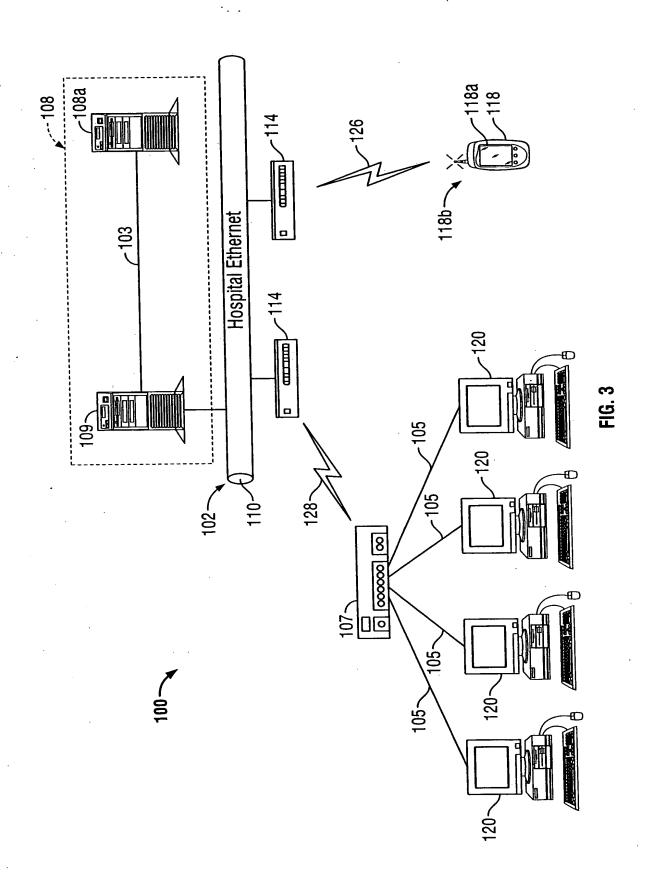
Inventors: Thomas L.C. Simpson et al.
Application No.: 10/748,589
Confirmation No.: 8944
Title: Medical Data Communication Notification and Messaging System and Method Sheet 1 of 59 Sheets



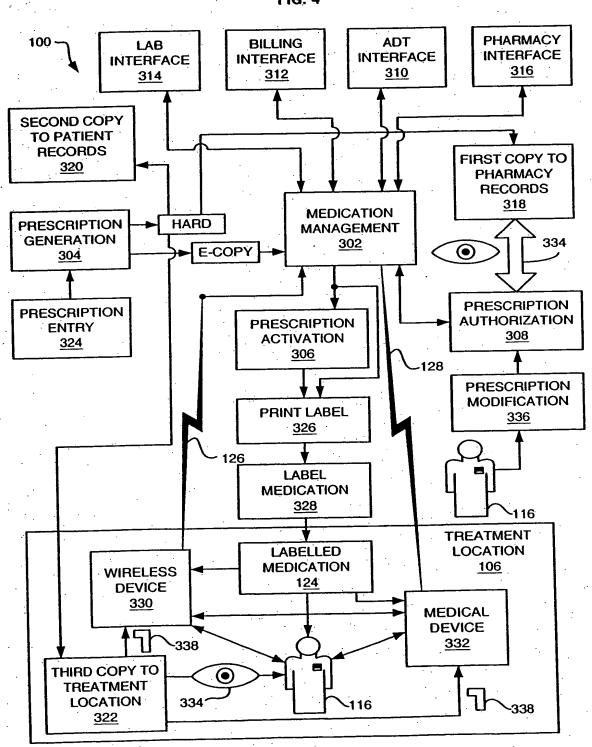
Inventors: Thomas L.C. Simpson et al.
Application No.: 10/748,589
Confirmation No.: 8944
Title: Medical Data Communication Notification and Messaging System and Method
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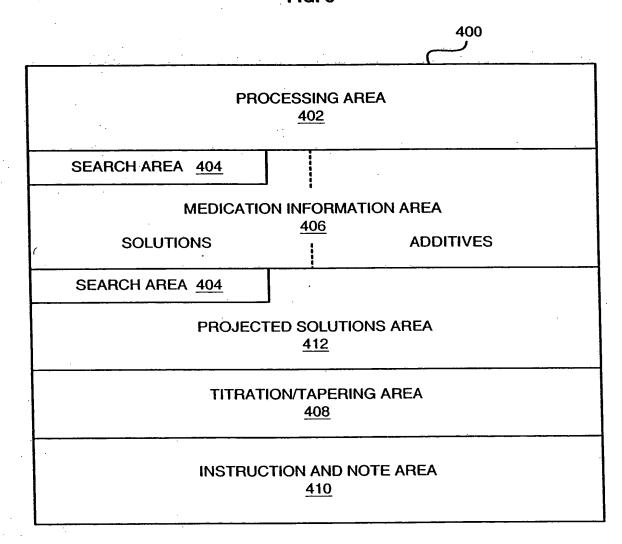
Title: Medical Data Communication Notification and Messaging System and Method Sheet 4 of 59 Sheets





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FIG. 5



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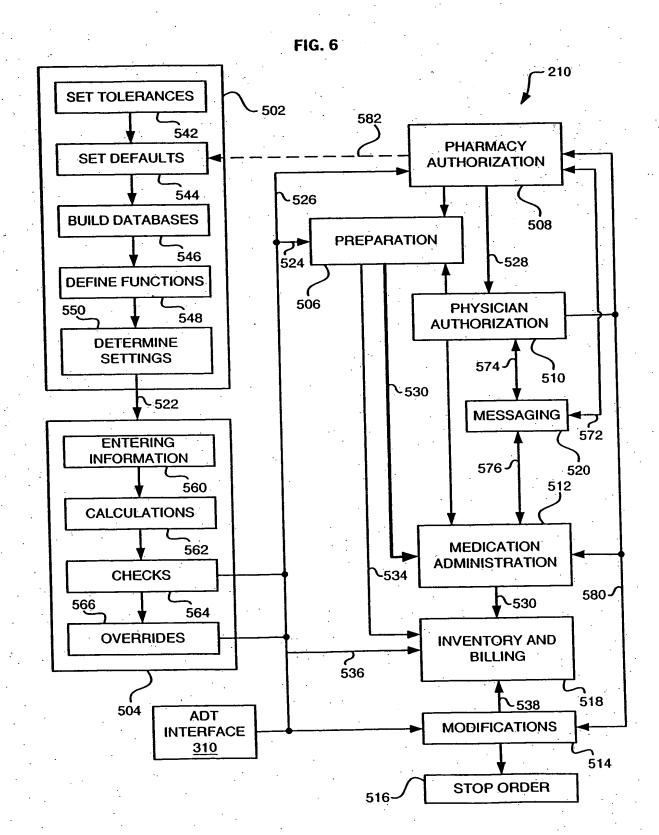
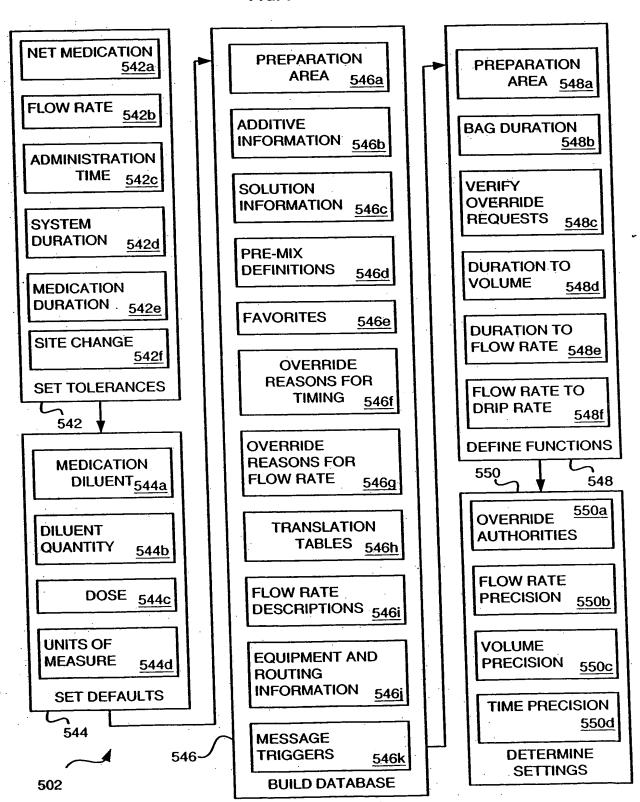
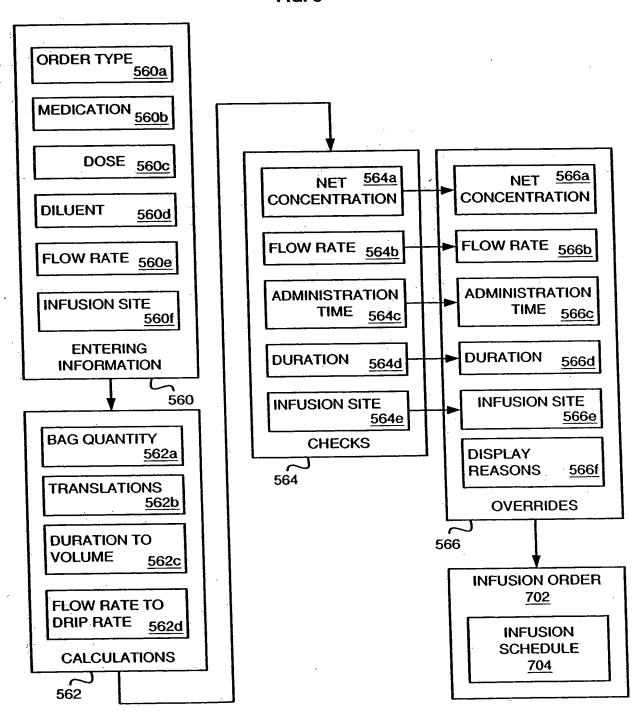


FIG. 7



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FIG. 8



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FIG. 9

SCAN 506b
INGREDIENTS

BAG DURATION
CHECK 506c

BAR CODE
PRINTING 506d

PREPARATION

506

FIG. 10

MEDICATION BAR

CODE <u>512a</u>

PATIENT BAR

CODE 512b

EXPIRATION CHECK 512c

TITRATE
NOTIFICATION 512d

FLOW RATE TO DRIP RATE DISPLAY 512e

"AS NEEDED" INFUSION INITIATION 512f

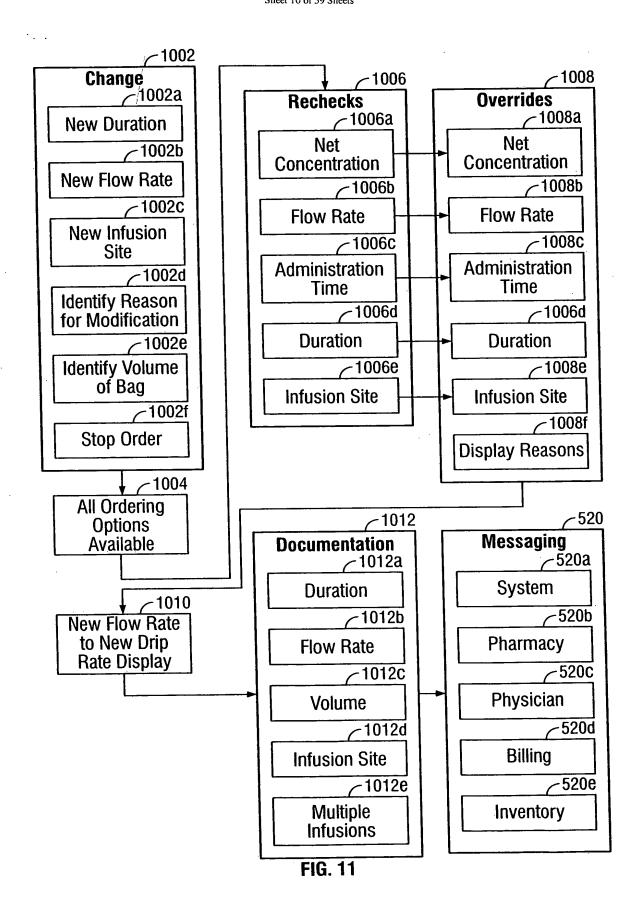
DOWNLOAD OPERATING PARAMETERS 512g

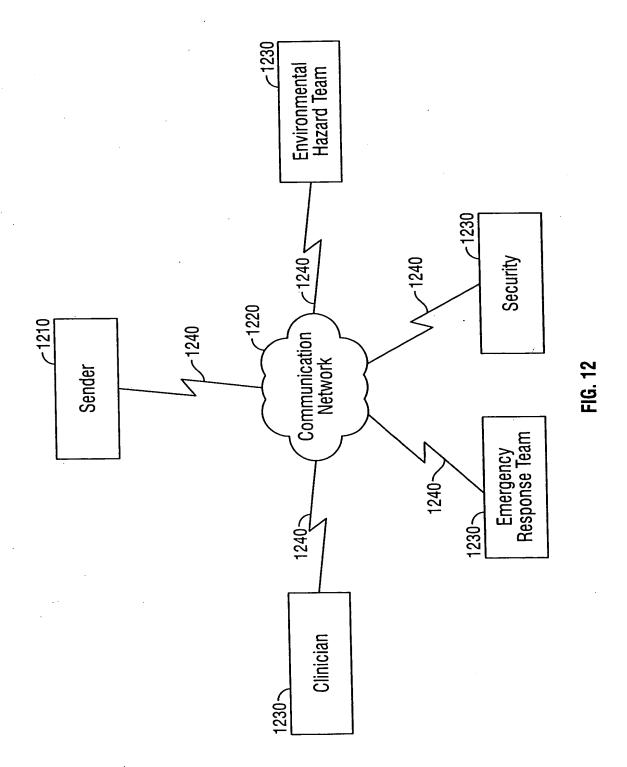
TIME MONITORING 512

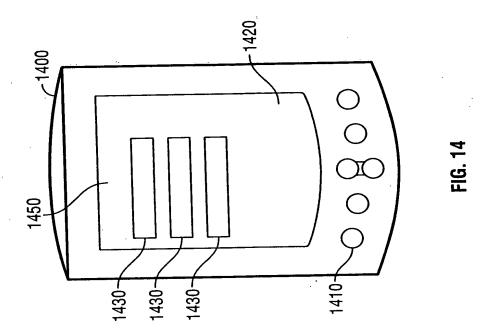
ADMINISTRATION

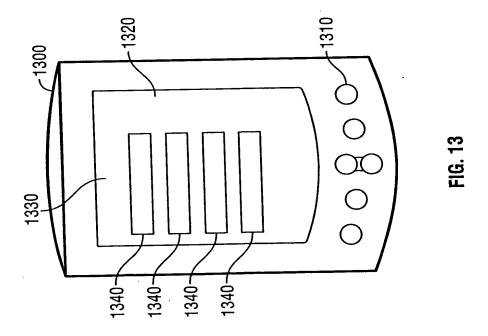
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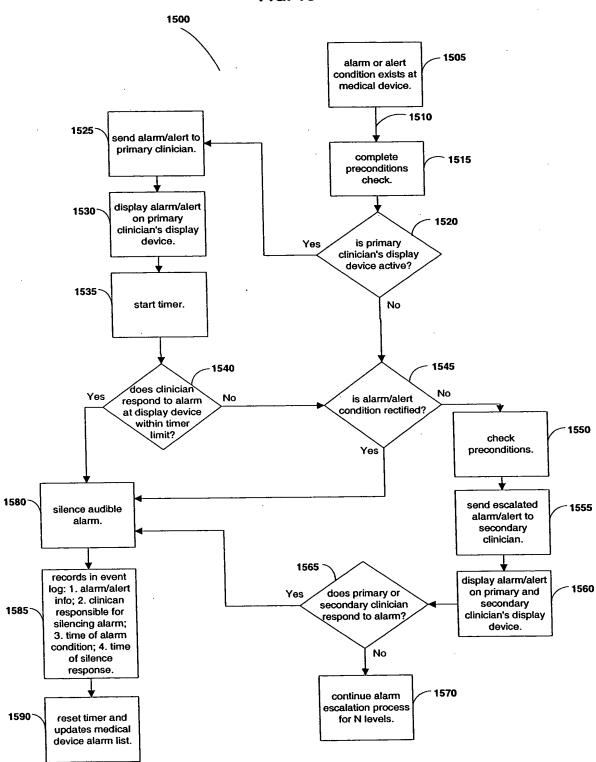




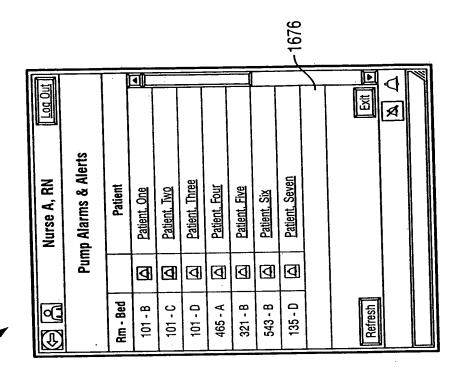
Title: Medical Data Communication Notification and Messaging System and Method

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FIG. 15



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-1666 -1664

Patient, One-

回 ₫

Patient

Rm - Bed 101 - B 101 - C 101 - D

Patient, Three-Patient, Two-

4872 Pump Alarms & Alerts

Nurse A, RN

FIG. 16B

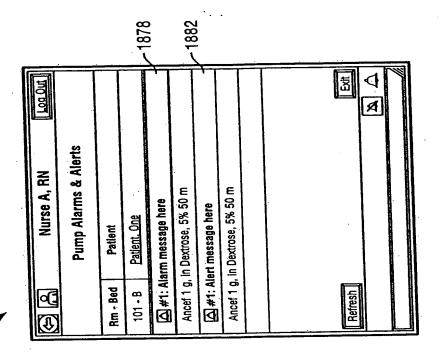
4

Refresh

FIG. 16A

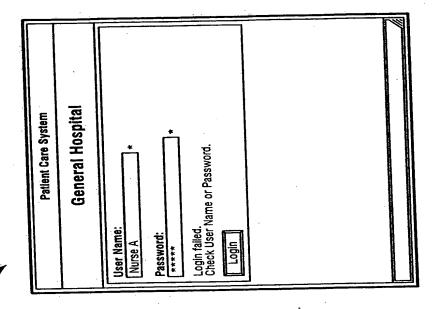
Title: Medical Data Communication Notification and Messaging System and Method

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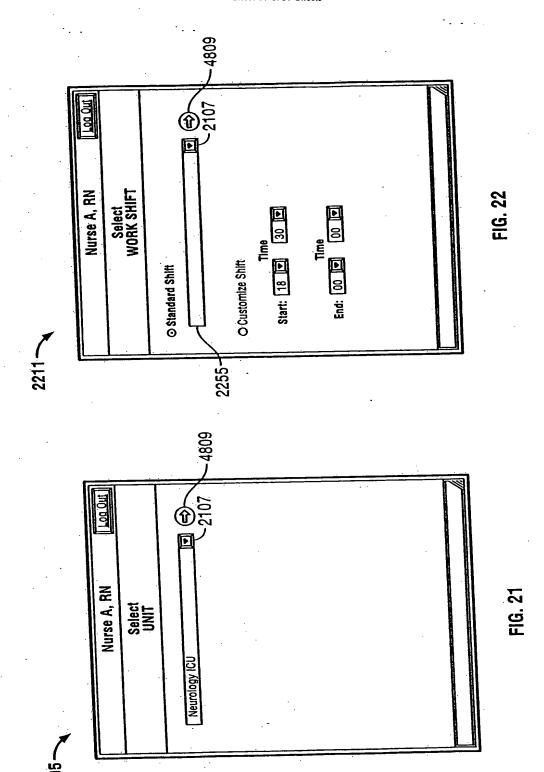
蓝 Pump Alarms & Alerts Nurse A, RN Ancef 1 g, in Dextrose, 5% 50 m 🛆 #1: Alarm message here Patient, One Patient Rm - Bed 101 - 8

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Title: Medical Data Communication Notification and Messaging System and Method Sheet 16 of 59 Sheets

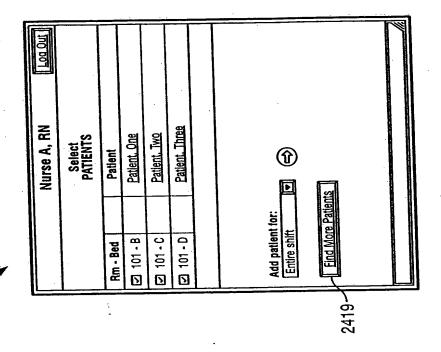


General Hospital Patient Care System Password: Nurse A

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1 Nurse A, RN Patient, One Patient, Two Patient My Patients Scan Patient: 101 - D 101 - B Rm - Bed 101 - C

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Ninety-Three, James RN Ninety Nine, Douglas, Mr. (MDLO MDUnitt: MDRoom1 - MDBed1 Dr.Ninety, Susan Allergies & Ht/Wt Med Hx lini-Chart: Allergies Date Observed Lab Results Acetaminophen 8-22 14:16 Drug Allergy

Nurse A, RN	Log Out
Patient, One - 101-B	
Mini-Chart: Altergies (NKA)	
<u>Administer Meds/Infusions</u>	
STOP Infusion	
RESUME Infusion	
Titrate Infusion	
Flow Rate History	
Pump Status	
Remove Patient from Shift	

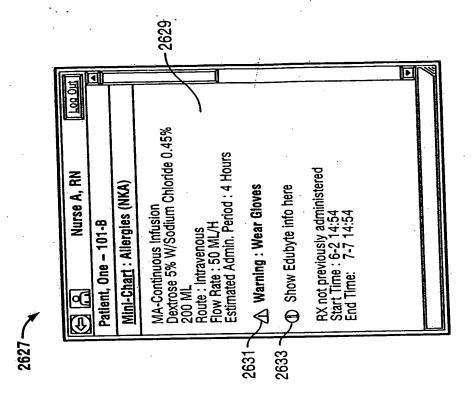
Title: Medical Data Communication Notification and Messaging System and Method Sheet 20 of 59 Sheets

Ninety-Three, James RN Ninety- Nine, Douglas, Mr. (MDLOC1)
MDUnitt: MDRoom1 - MDBed1
Dr.Ninety, Susan
Mini-Chart Allergies 3.6-5 mmol/L Range Allergies & HVWt Med Hx Result POTASSIUM 3.1 Lab Test

25216

Ninety-Three, James RN	100 OUT
Mini-Chart Allergies (NKA)	
Allergies & Ht/Mt [Med Hx] Lab Results	
All © Scheduled O PRN O Look Back Period: 24	
- data	
Acetaminophen Cap 500 MG 500 MG = 1 CAP	
TID Admin Date: 6-3 12:53 Patient Refused	
Back	

Inventors: Thomas L.C. Simpson et al.
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2625 25.9 2.09 Last 12:19 -> Continuous Infusion (De MORPHINE SULFATE Continuous Infusion Continuous Infusion (L Continuous Infusion (C Nurse A, RN Mini-Chart: Allergies (NKA) SCHED 13 Patient, One - 101-8 <- 10:19 **①** Med 13:30 17:30 11:30 15:30 Time E R 回 0

Title: Medical Data Communication Notification and Messaging System and Method Sheet 22 of 59 Sheets

WORKFLOW INFUSION: STOP
Ninety-Six, Samuel, Mr. MDRoom1MDBed1
Mini-Chart: Allergies
Continuous Infusion
Dexrose inj 20%
500 ML
Estimated Administration Period: 4
Hours
Please select a reason for Stop
Infusion
Discontinue order in system
Stop Time [M/D/Y HH:MM]
G6/18/2003
G6/18/200

FIG. 27B

2727b —

WORKFLOW INFUSION: STOP
Ninety-Six, Samuel, Mr. MDRoom1Mini-Chart; Allergies

Continuous Infusion
Dextrose inj 20%
500 ML
Soan Item: (A)
125 ML/H
Estimated Administration Period: 4 Hours
Order has been DC'd

Back to Patient list

FIG. 27A

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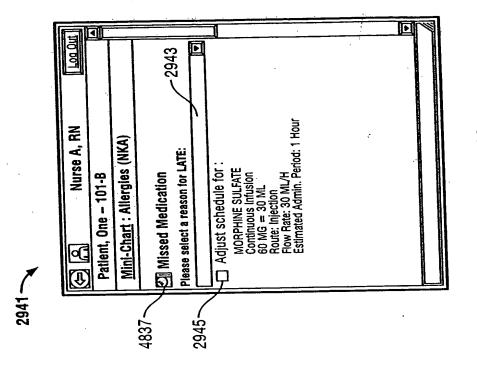
Ninety-Three, James RN WORKFLOW INFUSION: RESUME Vinetyfour-Pointfive, Fred, Mr. Continuous Infusion
Dextrose Inj 20%
500 ML.
Route: Intravenous Flow Rate:
125 ML/H
Estimated Administration Period:
4 Hours Vini-Chart; Allergies (Not Specified) Stopped w/o Order Please select a reason for Resume Infusion DRoom1 - MDBed1 Site re-established

FIG. 27D

Ninety-Three, James RN WORKFLOW INFUSION: RESUME Ninetyfour-Pointlive, Fred, Mr. MDRoom1 - MDBed1 Continuous Infusion
Dextrose Inj 20%
500 ML
Soute: Intravenous Flow Rate: 125
ML/H
Estimated Administration Period: 4
Hours Mini-Chart: Allergles (Not Specified) Û Stopped w/o Order

Scan Item:

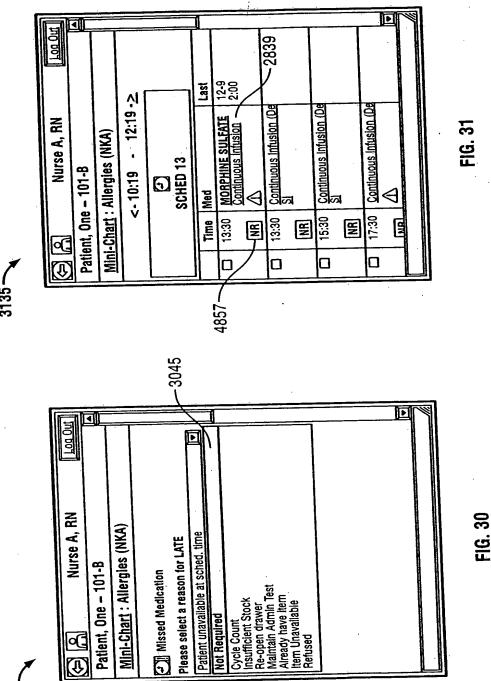
Title: Medical Data Communication Notification and Messaging System and Method Sheet 24 of 59 Sheets



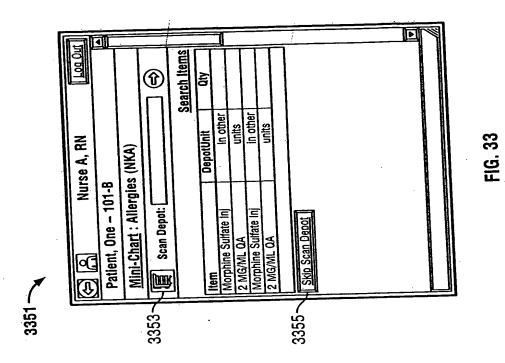
Last 12:19 -> Continuous Infusion (De Continuous Infusion (Do Continuous Infusion (L MORPHINE SULFATE Continuous Infusion Nurse A, RN Mini-Chart: Allergies (NKA) SCHED 13 Patient, One - 101-B <- 10:19 1 Med 13:30 15:30 17:30 13:30 Time Æ

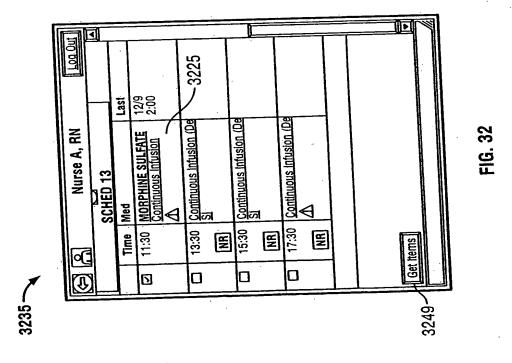
-16. 2

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Search Items In other units Nurse A, RN Mini-Chart: Allergies (NKA) Patient, One - 101-B Scan Depot: Scan code is invalid. orphine Sulfate In 2 MG/ML QA Morphine Sulfate In

1700 OUT		⊕					
Nurse A, RN	Patient, One – 101-8 Mini-Chart : Allergies (NKA)	Scan Item:	MORPHINE SULFATE Continuous Infusion 60 MG = 30 ML Route, Injection Flow Rate: 30 ML/H Estimated Admin. Period: 1 Hour	: (30 ML(s)	 Warning: Wear Gloves Show Edubyte Info here 		
₫	Patien Mini-C		3467 MORPHIN Continuo 60 MG = Route: In Flow Rati	Quantity: 30	War ⊕ Sho		

Title: Medical Data Communication Notification and Messaging System and Method Sheet 28 of 59 Sheets

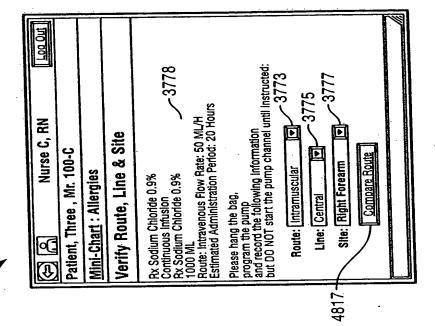


FIG. 37

Patient, One – 101-B

Mini-Chart: Allergies (NKA)

3661

Scan Patient: Cannot admin, select a reason: 3659
If Cannot admin, select a reason: 3659
Refused

3663

Waste/Return

G. 36

3657-

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Rx Sodium Chloride 0.9%
Continuous Infusion
Rx Sodium Chloride 0.9%
1000 ML
Route: Intravenous Flow Rate: 50 ML/H
Estimated Administration Period: 20 Hours Nurse C, RN Patient, Three , Mr. 100-C Scan Pump Channel Mini-Chart: Allergies

Select Pump Channel Mode Nurse C, RN Patient, Three, Mr. 100-C Select Pump Channel Mode: Rx Sodium Chloride 0.9% Confinuous Infusion Rx Sodium Chloride 0.9% 1000 ML Mini-Chart: Allergies

Bass 2887

Title: Medical Data Communication Notification and Messaging System and Method

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100 mL/hr Pump Settings Pharm & Pump Comparison Ancef 1 g, in Dextrose, 5% 50 mL run at 100 mL/hr Nurse A, RN Patient, One Rm - Bed 101-B Dr. One (111)111-1111 ext. 1 Pharm Label 100 mL/hr 乡 Comparison MATCHES. Press "Start" Key on pump. Rate

FIG. 39A

Pliggyback Infusion, ensure PRIMARY Is placed LOWER THAN han Pregyback and that Piggyback roller clample OPEN. Continuous Infusion Rx Sodium Chloride 0.9% 1000 ML Route: Intravenous Flow Bate: 50 ML // Estimated Administration Period: 20 Hours CIICK COMPARE below Now and wait until instructed to start pump channel. Press the "start" key on the pump Now. then Click COMPARE 4817 Pharm & Pump Comparison Nurse C. RN > If this is a PIGGYBACK --Frogram the Pump Channel and: > If this is a PRIMARY -

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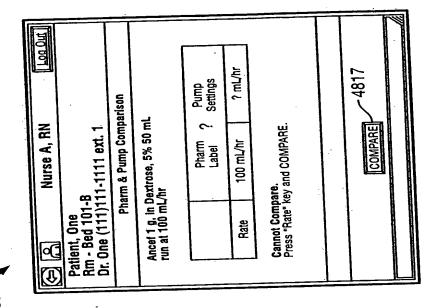


FIG. 41

Please Verify with PHYSICIAN Order.
Then to accept the mismatch, press "Start" key on pump and then click "OK" below.
You can also reprogram the pump and then click
"Compare again." 481 50 mL/hr Pump Settings Pharm & Pump Comparison Ancef 1 g, in Dextrose, 5% 50 mL run at 100 mL/hr # Nurse A, RN Patient, One Rm - Bed 101-B Dr. One (111)111-1111 ext. 1 Pharm Label 100 mL/hr Ŕ Rate

FIG. 40

Title: Medical Data Communication Notification and Messaging System and Method

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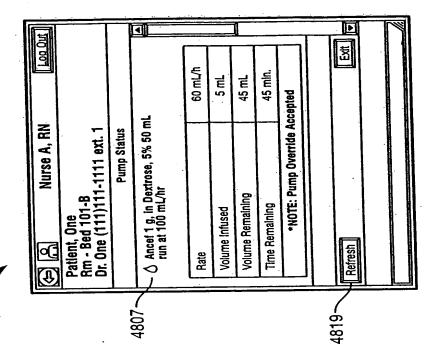


FIG. 43

-1G. 42

Patient, One
Rm - Bed 101-B
Dr. One (111)111-1111 ext. 1

Pharm & Pump Comparison

Pharm & Pump Comparison

Ancet 1 g, in Dextrose, 5% 50 mL

run at 100 mL/hr

Rate 100 mL/hr

Cannot Compare. Press "Start" key on pump and click COMPARE, to retry comparison.

4287~

Title: Medical Data Communication Notification and Messaging System and Method

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Communication Loss Alert for the following Patients If a Yellow light is flashing on the WIRELESS MODULE and it is beeping, the system may be down. Call IT or Blomed. Plug in and turn on all pumps. If that does not resolve the problem, Call IT or Biomed. Nurse A, RN Patient, Three Patient Patient, Two Patient, One Trouble Shooting Tips: X X × Rm - Bed 101 - B 101 - D 101 - C

FIG 45A

4501

| Column | C

FIG. 44

Inventors: Thomas L.C. Simpson et al.
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EXI Œ Low Battery Alert for the following Patients Patient, One Plug WIRELESS MODULE into power outlet. Nurse A, RN **Patient** Less than 30 minutes of battery left in WIRELESS MODULE. Œ Rm - Bed 101 - B Refresh (U)

Exit Communication Loss Alert for the following Patients If a Yellow light is flashing on the WIRELESS MODULE and it is beeping, the system may be down. Call IT or Blomed. Plug in and turn on all pumps, If that does not resolve the problem, Call IT or Blomed. Nurse A, RN Patient Trouble Shooting Tips: - 0R-Rm - Bed \(\frac{1}{2}\) Refresh.

FIG. 45B

Inventors: Thomas L.C. Simpson et al.
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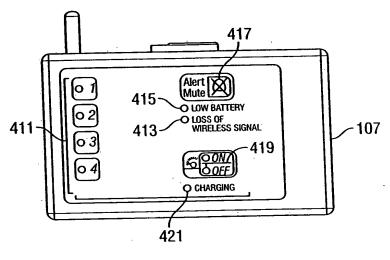


FIG. 47

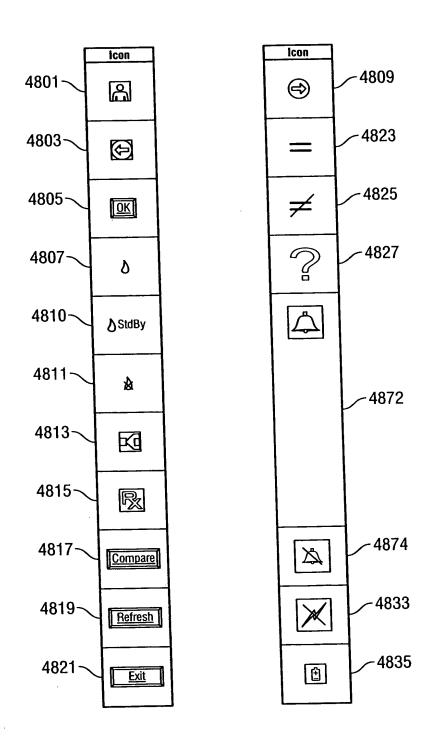
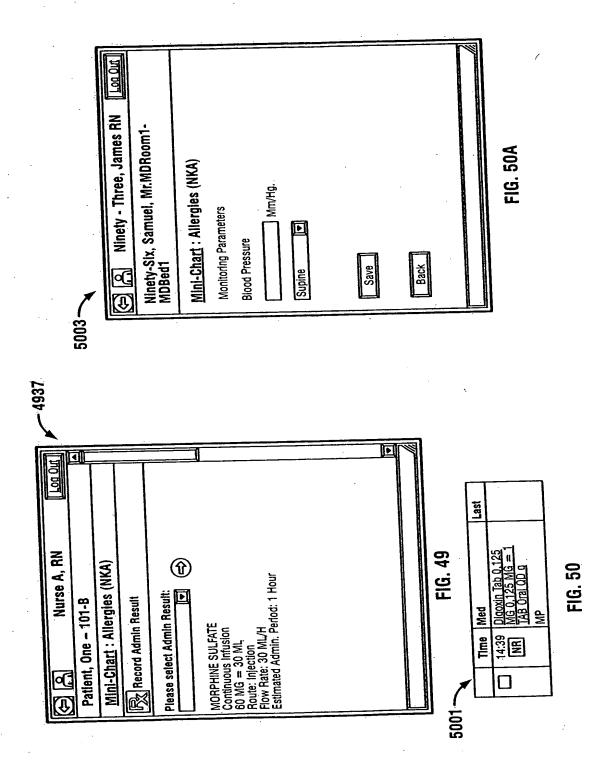


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5101~

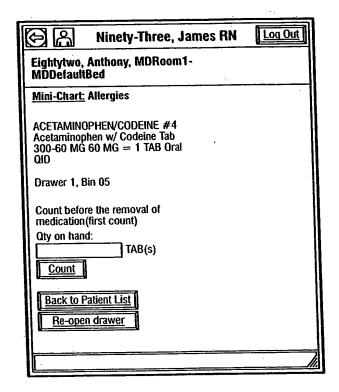
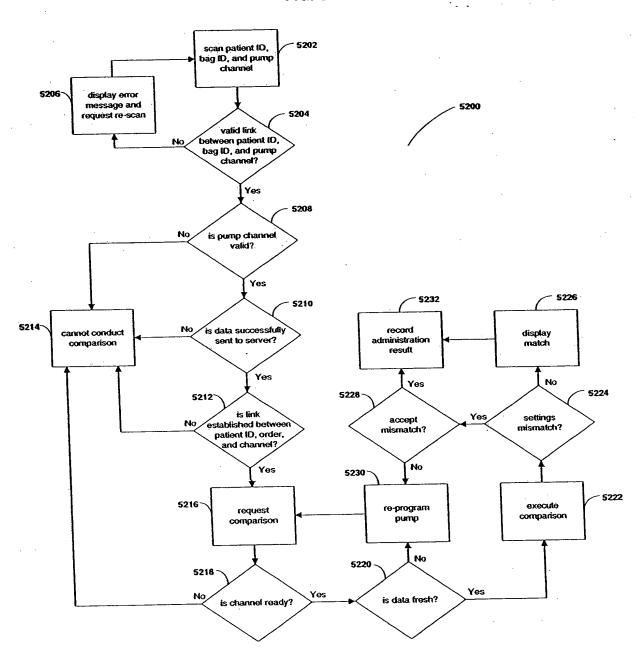


FIG. 51

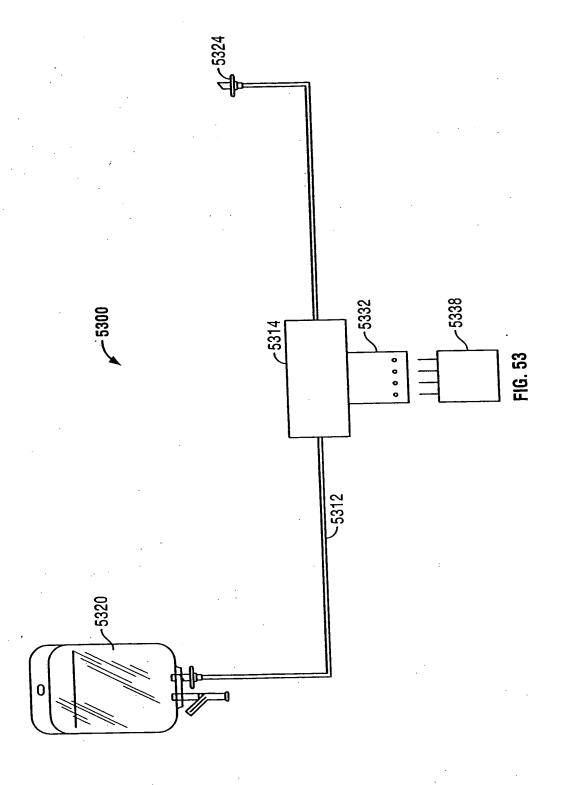
Inventors: Thomas L.C. Simpson et al. Application No.: 10/748,589 Confirmation No.: 8944

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FIG. 52



Inventors: Thomas L.C. Simpson et al.
Application No.: 10/748,589
Confirmation No.: 8944
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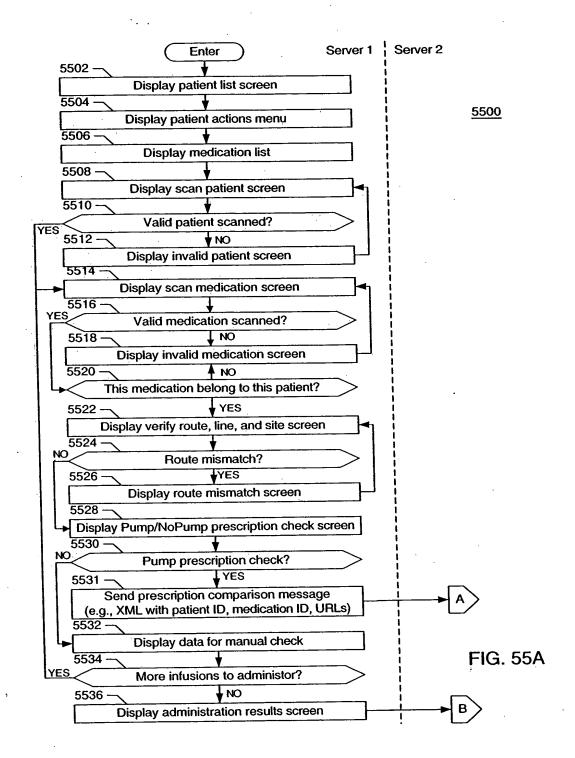


Title: Medical Data Communication Notification and Messaging System and Method Sheet 41 of 59 Sheets First Central Computer Operating System **NET** Internet Framework Information Server PumpDataListener Incoming Interface from Hub Route PDA First Central DatabaseRefreshListener Outgoing Interface to Second Central Computer Computer Application DatabaseRefreshListener Incoming Interface to Second Central Computer 5412 RoutePDA Incoming Interface from PDA <u>5422</u> 5416 **Active Directory** Domain Service <u>5418</u>

FIG. 54

5414

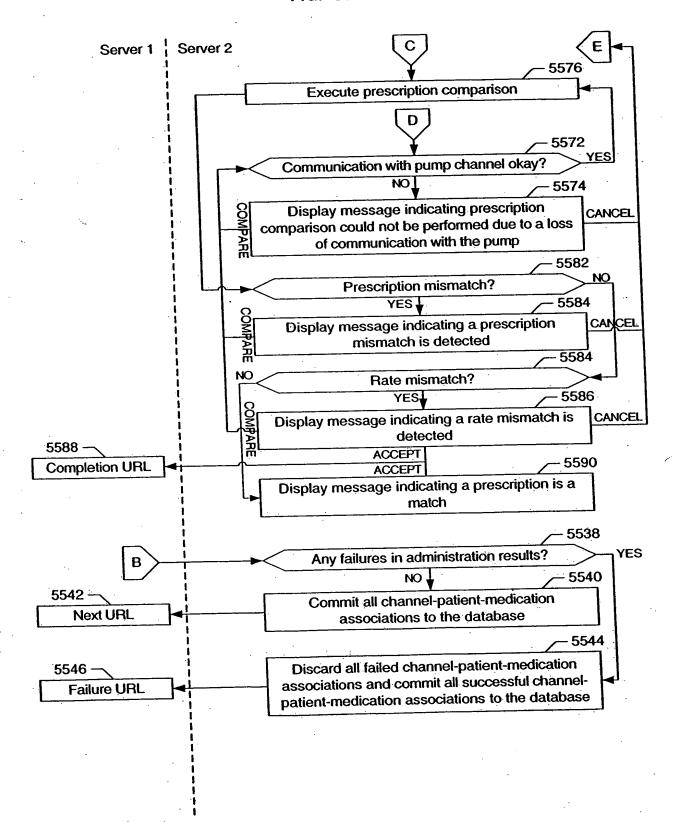
Title: Medical Data Communication Notification and Messaging System and Method Sheet 42 of 59 Sheets



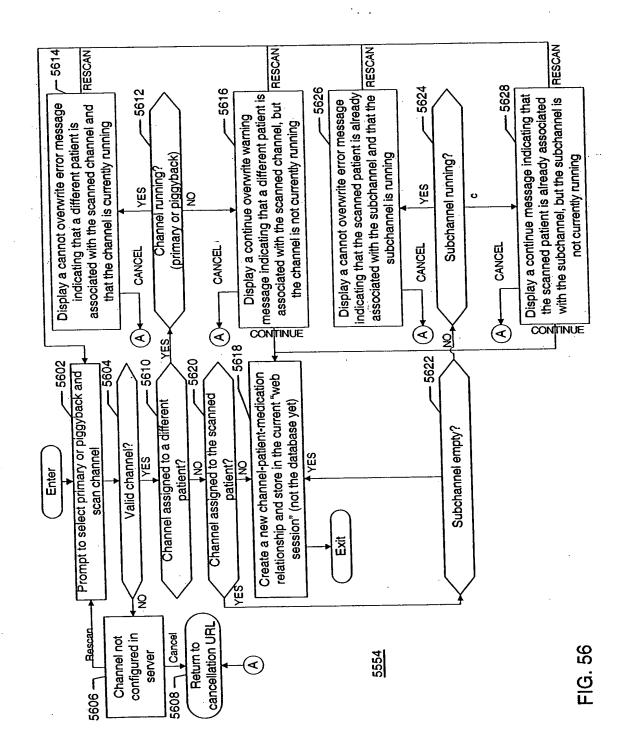
Title: Medical Data Communication Notification and Messaging System and Method Sheet 43 of 59 Sheets

FIG. 55B Server 1 **Enter** Server 2 5548 Valid message? NO, 5550 Display message indicating prescription could not be compared due to missing data 5554 Perform channel scanning process VALID CHANNEL 5556 Display message to program channel press "Compare" 5560 Communication with pump channel okay? YES 5562 NO, Display message indicating prescription comparison could not be performed due to a loss of communication with the pump 5558 CANCEL 5552 Discard new channel-patient-medication Cancellation URL associations 5564 Missing any channel data? 5566 YES Display message indicating prescription COMPARE CANCEL. comparison could not be performed due to missing 5568 Channel running? NO 5570 YES Display message indicating prescription OMPARE CANCEL. comparison could not be performed and instruct user to press the "Start" key on the pump 5578 Pump focus issue? 5580 YES. Display message indicating prescription CANCEL comparison could not be performed and instruct user to press the "rate" key on the pump

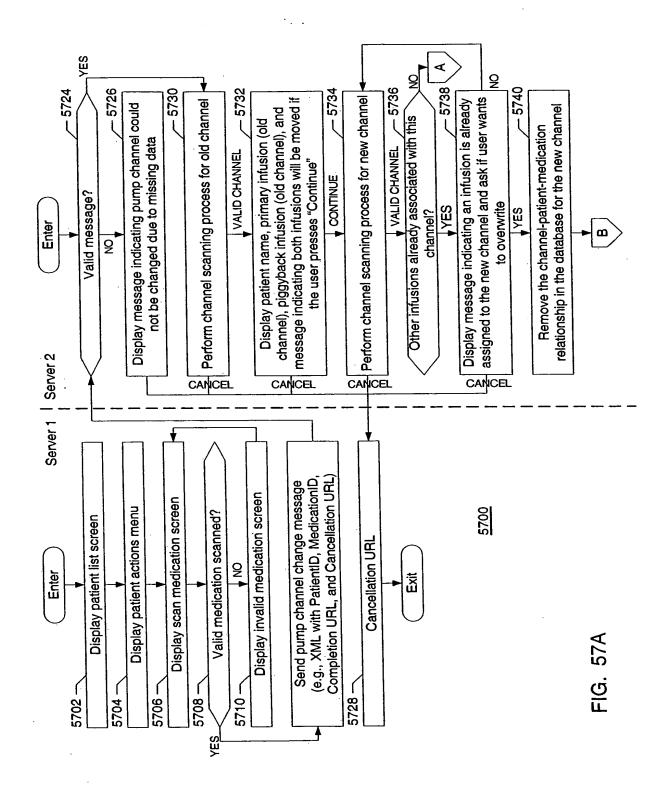
FIG. 55C



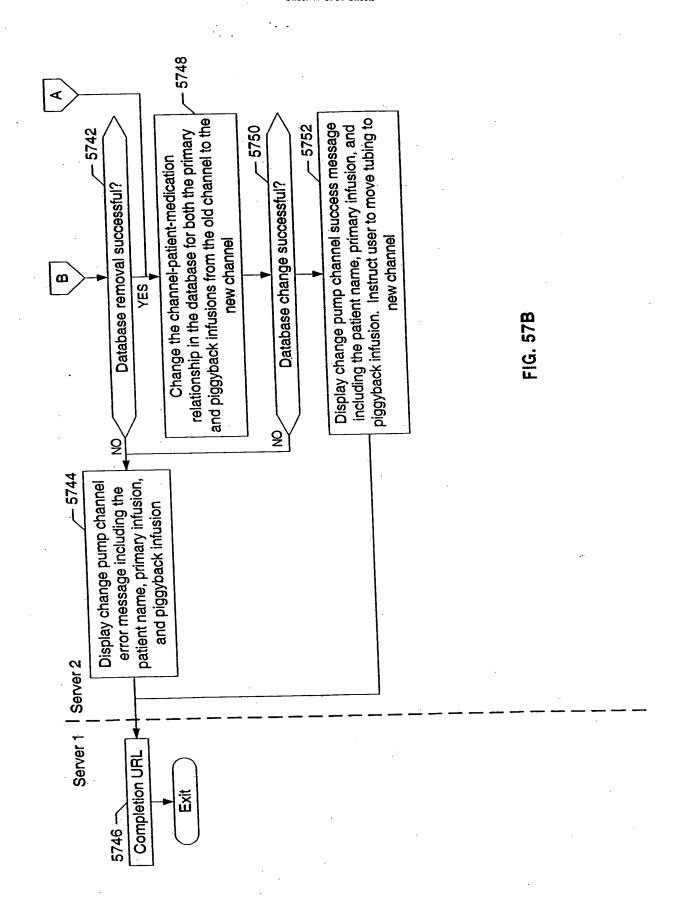
Title: Medical Data Communication Notification and Messaging System and Method Sheet 45 of 59 Sheets

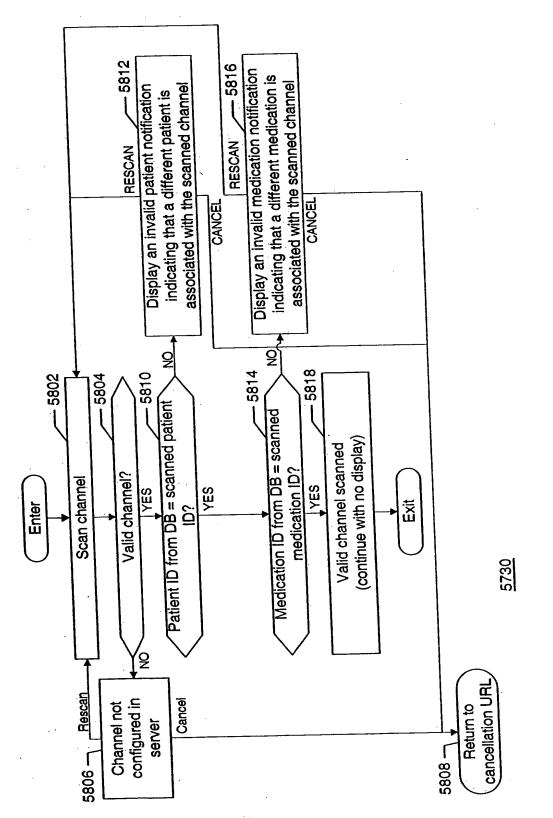


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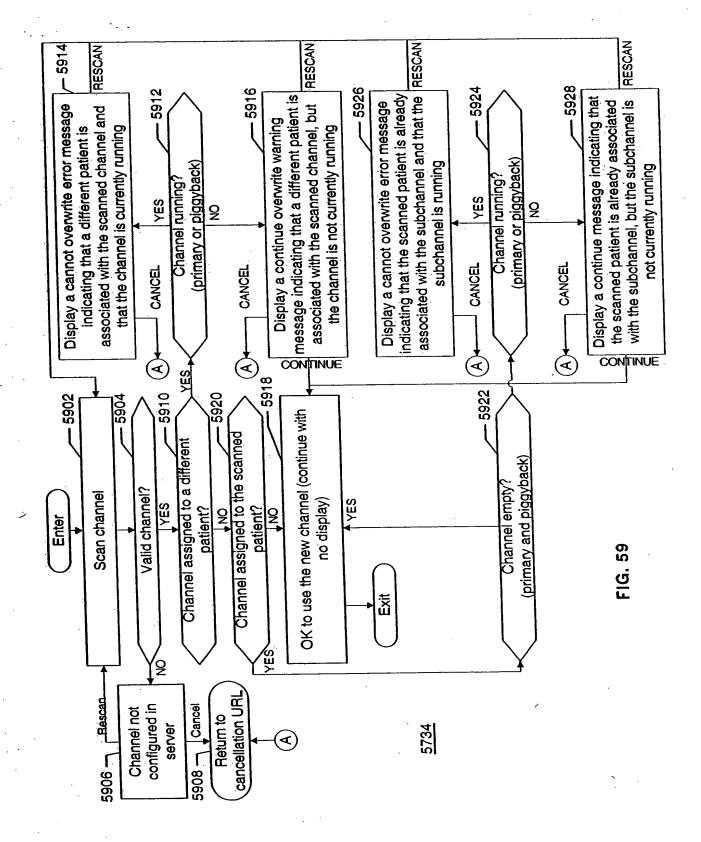


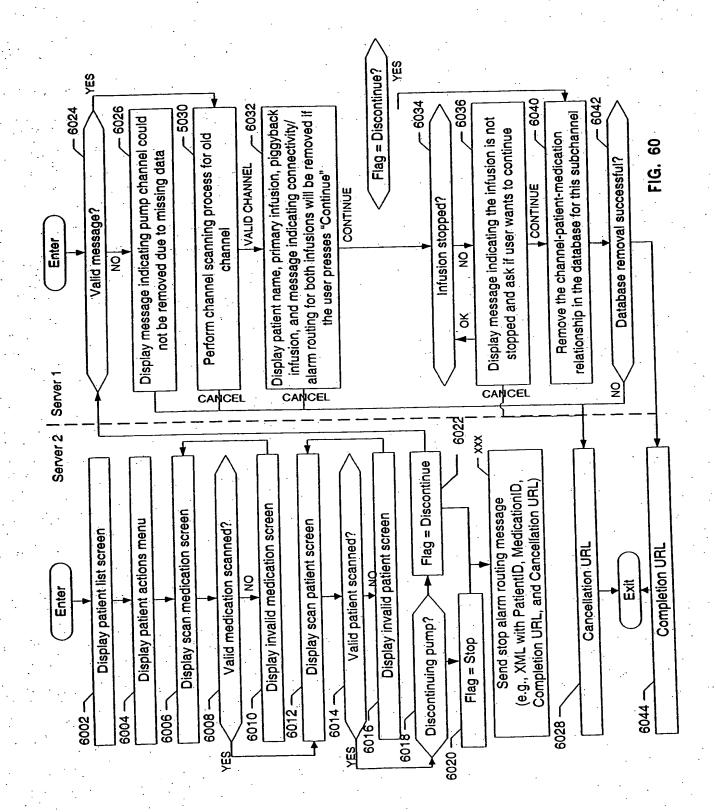
Title: Medical Data Communication Notification and Messaging System and Method Sheet 47 of 59 Sheets



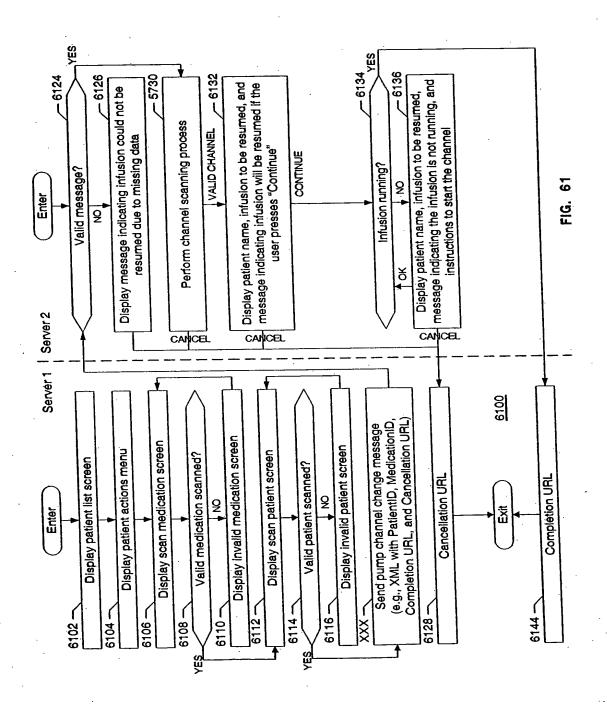


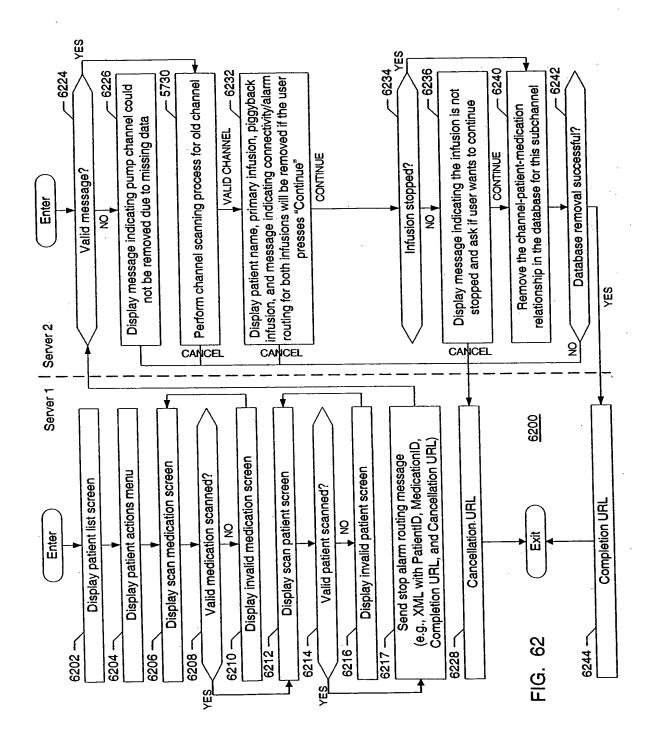
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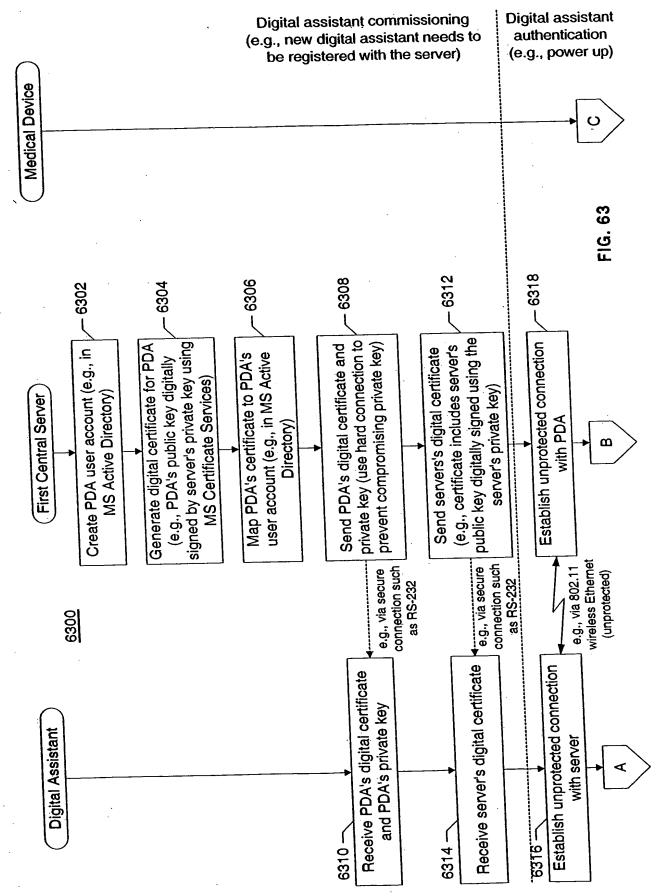
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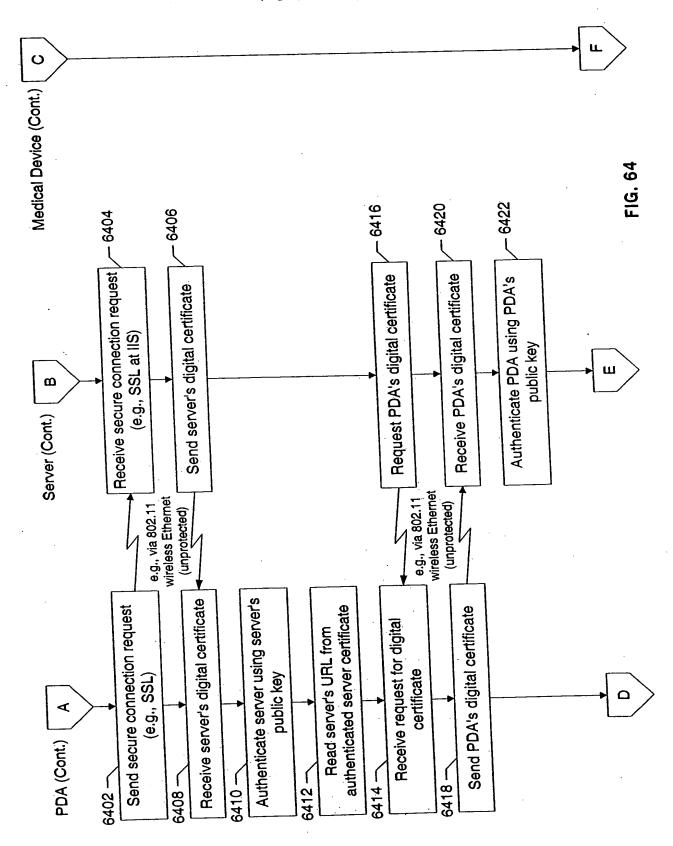


Title: Medical Data Communication Notification and Messaging System and Method

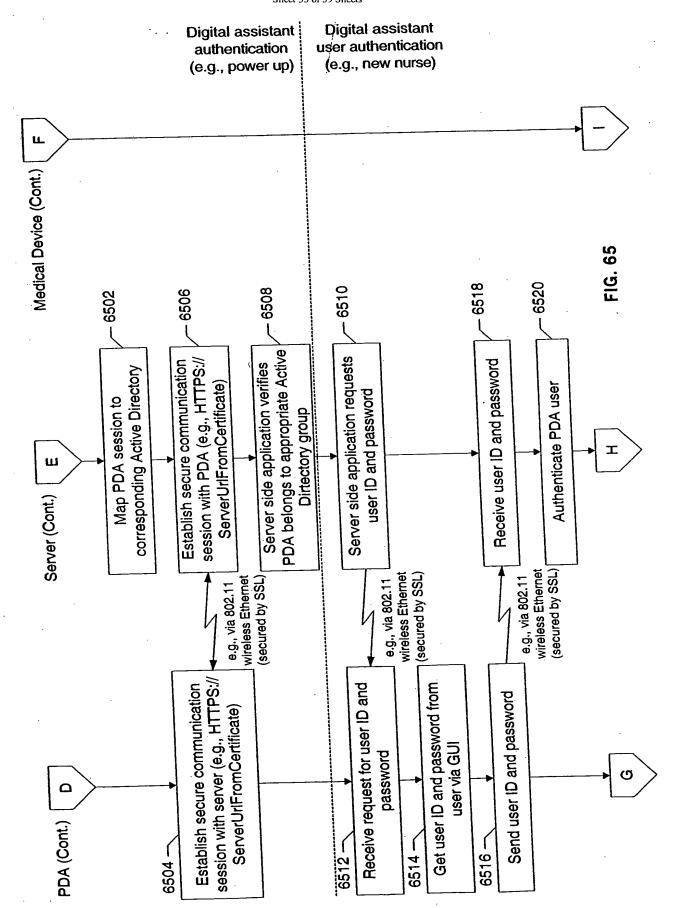
Sheet 53 of 59 Sheets



Digital assistant authentication (e.g., power up)



Title: Medical Data Communication Notification and Messaging System and Method Sheet 55 of 59 Sheets



Title: Medical Data Communication Notification and Messaging System and Method

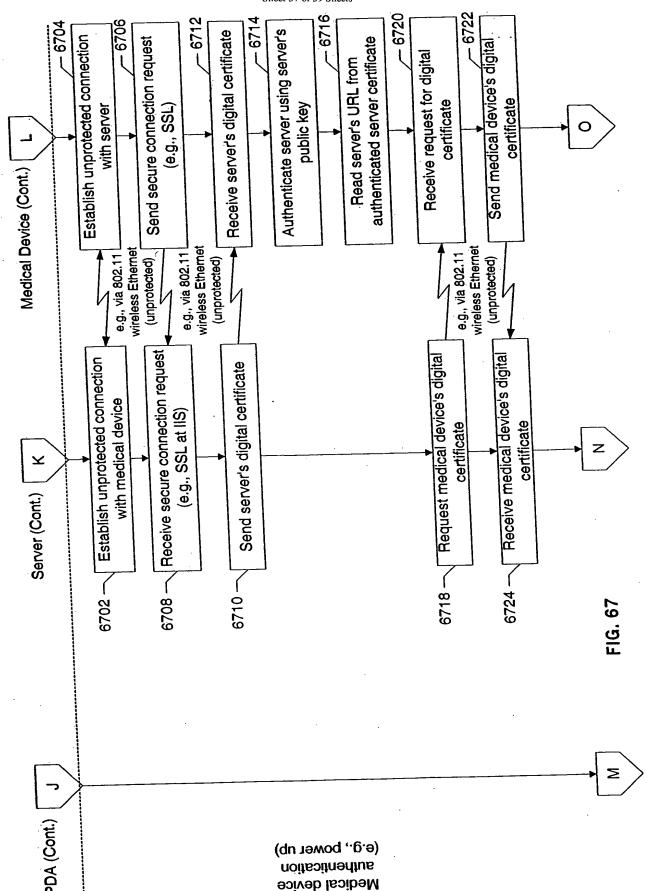
Sheet 56 of 59 Sheets 6614 6610 Receive server's digital certificate Receive medical device's digital certificate and private key Medical Device (Cont.) e.g., via RS-232 e.g., via RS-232 FIG. 66 public key digitally signed using the certificate and private key (use hard Map medical device's certificate to (e.g., certificate includes server's device's user account (e.g., in MS Send servers's digital certificate Send medical device's digital medical device (e.g., device's Generate digital certificate for server's private key using MS public key digitally signed by compromising private key) Create medical device user account (e.g., in MS Active connection to prevent server's private key) Certificate Services Active Directory) Directory) Server (Cont.) 6612 9099 6608 6604 registered with the server) (e.g., new pump needs to be Medical device commissioning

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